

## **Are Conventional Distance Corrections Sufficient for Monitoring a CTBT? Investigating Robustness and Transportability**

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Techniques for discrimination and identification of widely spaced seismic events require corrections for path effects such as differences in attenuation and geometrical spreading. We investigate the robustness of the standard approach for estimating such corrections and the transportability of these corrections from region to region using an extensive ground truth data set and numerical simulations. We focus on a dense (~1 km spacing) 400 km long linear array of recordings of the Non-Proliferation Experiment (NPE), a one kiloton chemical explosion detonated on September 22, 1993 at the Nevada Test Site. The density of stations and length of the array make this a very unique dataset. Additional data from broadband stations throughout the western U.S. provide additional information. Following standard practices, we assume that propagation effects can be approximated by,  $A(R, \omega) = S(\omega) e^{-\pi R / Q(f)^C} / R^\gamma$ , and use the conventional two-step least squares procedure to estimate a source spectrum,  $S(\omega)$  and attenuation  $Q(f) = Q_0 f^\delta$  spectrum for a variety of frequency bands, distance ranges, and station configurations. Our results can be summarized as follows: 1) We find large trade-offs between, and uncertainties in, source and attenuation spectral estimates when the station distributions cross structural boundaries. 2) Within tectonic regions, trade-offs between source and attenuation parameters are smaller but there are still significant trade-offs between  $Q_0$  and the frequency dependence of  $Q$ . 3) Variations in distance corrections due to variations in data or trade-offs between source,  $Q_0$ , and  $\delta$  can be responsible for significant uncertainties in estimated discrimination parameters.

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